

REMARKS

The November 20, 2008 Office Action has been carefully reviewed and considered.

Claim 1 was amended in a prior response so that the electrically insulating material layer formed on the MOS gate region and on the active region for the bipolar transistor is a **nitride** material.

An opening is produced in the electrically insulating nitride layer to define a base region in the active region for the bipolar transistor. However, claim 1 explicitly states that the opening in the electrically insulating nitride layer is produced so that the remaining portions of the nitride layer **partly cover the active region for the bipolar transistor**. Figure 14 of the instant application shows how the nitride layer (141) can be removed over a portion of the bipolar active region (41) to form a base opening, but still cover the remainder of the active region of the bipolar transistor (labeled BIP NPN in Figure 14).

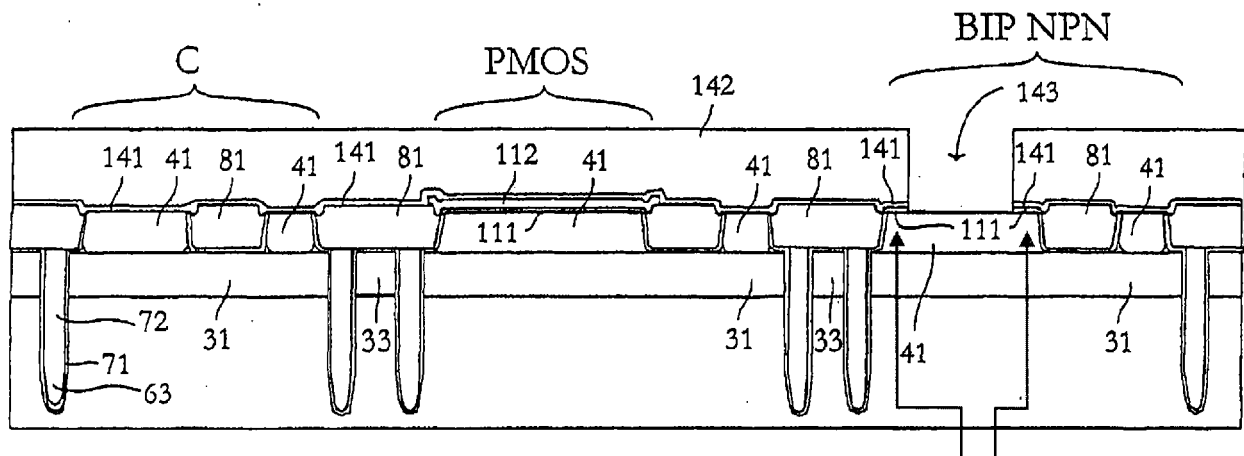


Fig. 14

Portions of bipolar active region 41 covered by nitride layer 141 after emitter/base opening step 143

Claim 1 stands rejected under 35 U.S.C. §103(a) as being unpatentable over U.S.

Patent Publication No. 2002/0033509 (Ammo) in view of U.S. Patent No. 6,156,594 (Gris) or

U.S. Patent Publication No. 2002/0030244 (Pruijimboom). Yet, the Patent Office provides no

explanation as to how Ammo can be properly modified based on the teachings of either Gris or

Pruijimboom to arrive at the present claimed invention. For example, the conclusion at p. 10 of the Office Action mentions that both Gris and Pruijimboom disclose a nitride layer which partly covers the active region of a bipolar transistor after the formation of an opening in the base region of the transistor, but fails to sufficiently establish how Ammo is modifiable in view of these teachings. The statement is conclusory and self-supporting at best and fails to support a proper obviousness rejection.

Section 706.02(j) of the MPEP requires all Examiners to set forth the following when a claim is rejected under 35 U.S.C. §103:

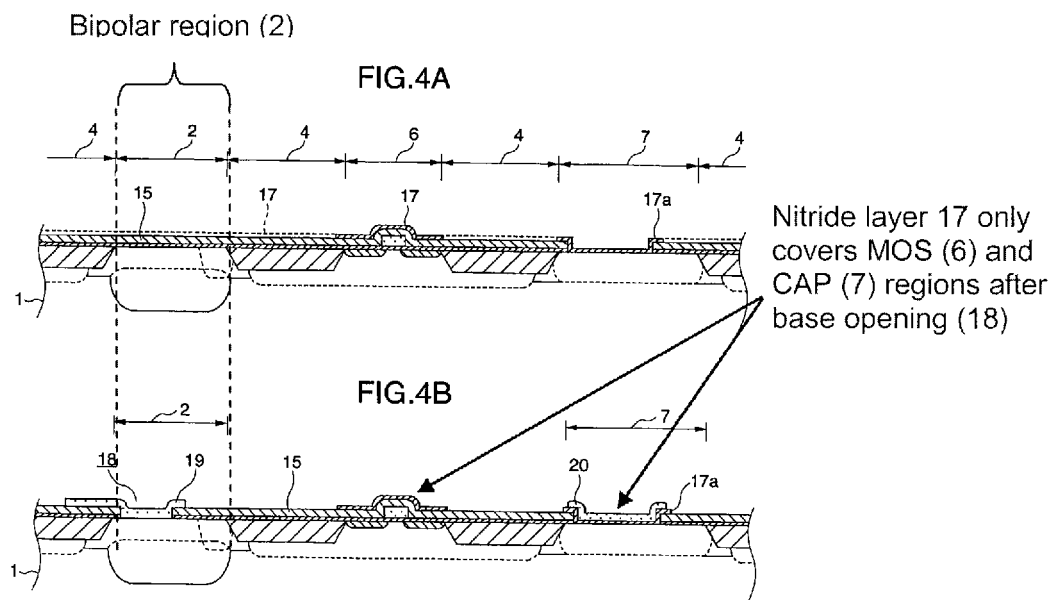
- (A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate,
- (B) the difference or differences in the claim over the applied reference(s),
- (C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and
- (D) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.

In the instant case, the Office fails to show how Ammo can be modified so that the active region of the bipolar device (2) of Ammo's device is partly covered by the nitride layer (17) after a base opening (18) is formed in an underlying silicon oxide layer (15).

The failure to explain how Ammo can be properly modified ignores Deputy Commissioner Focarino's memorandum issued on May 3, 2007 which states the Office's position regarding the formulation of obviousness rejections in light of the Supreme Court decision on *KSR Int'l. Co., v. Teleflex, Inc.* The May 3, 2007 Office communiqué states that "it **remains necessary** to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed" when formulating a rejection under 35 U.S.C. §103(a) (emphasis added). In the instant Office Action, no reasoning is provided as to why a person of ordinary skill in the art would have combined the teachings of either Gris or

Pruijimboom with those of Ammo in the manner claimed. Absent a proper showing under MPEP §706.02(j), the Office fails to satisfy its burden of establishing a *prima facie* case of obviousness. For this reason alone, all claim rejections are in error and must be withdrawn.

In addition, Ammo actually teaches away from the present claimed invention in that Ammo explicitly states that the silicon nitride layer (17) is purposely removed from the entire bipolar transistor region (2). The Examiner's attention is respectfully drawn to paragraph [0042] of Ammo which states that "the silicon nitride film 17 is removed except of that in the MOS region 6 and the MISC region 7 by RIE using a resist pattern (not shown) as a mask" (emphasis added). Figures 4A and 4B are reproduced immediately below and clearly show that no portion of the nitride layer (17) remains over the bipolar active region after the base opening (18) is formed. Instead, only oxide layers (12 and 15) partly cover the bipolar transistor region (2) of Ammo's device, neither of which contains nitride as claimed. The fact that Ammo teaches away from an aspect of the claimed is a significant factor weighing against obviousness. See *In re Gurley*, 27 F.3d 551 (Fed. Cir. 1994). For this additional reason, all claim rejections are in error and must be withdrawn.



New Claim 56-58

New claim 56 is similar to original claim 21, but further requires a doped buried region to be formed underneath the active regions for **both** the bipolar transistor and the MOS device. The field isolation area around the active regions for the bipolar transistor and the MOS device is formed as first and second shallow trenches in the silicon substrate. The first shallow trench extends vertically from the substrate surface and down into the first doped buried region. The second shallow trench similarly extends vertically from the substrate surface and down into the second doped buried region. The shallow trenches are filled with an electrically insulating material. New claims 57 and 58 further specify how the doped buried regions are formed. No new matter is added by way of these new claims. For example, see Figures 2-5 and the corresponding text of the instant application. None of the cited references teaches or suggest the features of new claim 56-58.

For example, Ammo has an N+ bulk region (3) formed underneath the active region for the bipolar transistor (region 2), but no doped buried region formed underneath the active region for the MOS device (region 6) as recited in new claim 56. See Figure 3A of Ammo. Gris similarly has an N+ buried layer (3) formed only underneath the active region (2) for the bipolar transistor. No doped buried region is formed underneath the active region (2) for the MOS devices. See Figure 10 of Gris. Pruijimboom has doped buried regions (11 and 27) formed underneath the active regions for a bipolar transistor (LPNP) and MOS devices (NMOS and PMOS). However, Pruijimboom fails to teach or suggest shallow trenches which extend vertically from the substrate surface and down into the doped buried regions formed under both types of transistor devices as recited in new claim 56. To the contrary, Pruijimboom discloses field oxide regions (22 and 26) which terminate before extending into the doped buried regions (11 and 27), creating a vertical space between the field oxide regions (22 and 26) and the

doped buried regions (11 and 27). Accordingly, none of the cited references, alone or in any combination, render new claims 56-58 unpatentable.

Conclusion

In view of the amendments and remarks made herein, Applicant respectfully submits that the present application is now in condition for immediate allowance. Action to such affect is respectfully requested. The Examiner is encouraged to contact Applicant's attorney at (919)-854-1844 if any outstanding matters can be readily addressed by a phone call.

Respectfully submitted,
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